

Leptospirosis:

the possible risk to those participating in water-based sports and activities

INTRODUCTION

Outdoor sports and recreational activities based around water are increasingly popular. Such activities include outdoor swimming, 'Tough Mudder' races, canoeing, and triathlons. For example, the number participating in triathlons is now over 150 000, an increase of 7% since 2015.¹ Between October 2015 and October 2016 over 71 000 people took part in rowing, 107 000 in angling, and 41 000 in canoeing.² However, such activities expose participants to infection with leptospirosis. GPs need to be aware that the condition may be seen in people not typically considered to be at such risk. Leptospirosis is easily misdiagnosed,³ thus awareness that it may be seen in these new risk groups could aid prompt identification of infection.

Leptospirosis is a zoonotic bacterial infection, caused by spirochaetes of genus *Leptospira* (Figure 1).³ Many mammals are carriers of infection, rats being the most well known.⁴ Infection resides in the renal tubules of affected animals, leptospires being emitted via urine into the environment.⁴ Humans become infected through activity in contaminated areas. Leptospires gain entry through abrasions, mucous membranes, and the conjunctiva.³ Leptospirosis was traditionally considered as mainly an

occupational condition, affecting farmers, miners, and sewer workers.

OUTDOOR RECREATION AS A RISK

Leptospirosis has been reported in participants of a variety of outdoors sports and activities including, triathletes,⁵ kayakers and canoers,^{6,7} rowers,⁸ and wild swimmers.⁹ Public Health England records cases occurring in England and Wales.⁹ Participation in water-based activities is often cited in those contracting infection while abroad. For example, in the third quarter of 2017 nine cases contracted abroad involved canoeing, rafting, or swimming. However, water-based activity is also implicated in English and Welsh cases. Exposure to fresh water is often mentioned as a risk factor. In the second quarter of 2017 someone contracted leptospirosis after white-water rafting in Scotland. In the third quarter of 2015 a case occurred after wild swimming. In 2014 participation in triathlons led to a number of cases, including one participant of a triathlon at the Derbyshire Chatsworth country estate. Also in 2014 two swimmers of the Thames and one of the river Lune contracted leptospirosis.⁹ The risk for canoeists has been predicted as being 2.5 cases for every 5 million freshwater users yearly, leading

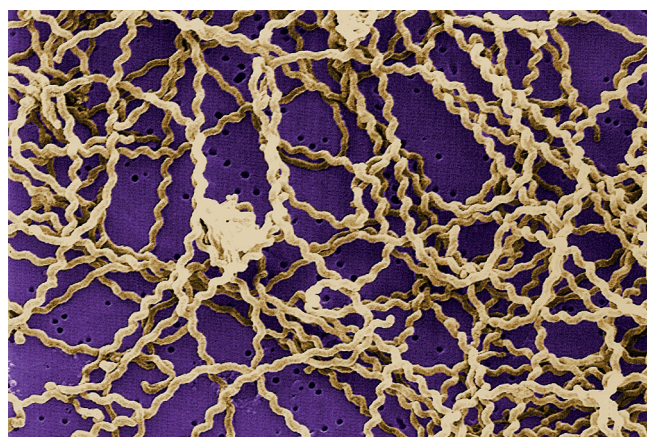


Figure 1. *Leptospira* bacteria. Scanning electron microscopic (SEM) image of bacteria atop a 0.1 μ m polycarbonate filter. Photo: Janice Haney Carr. Provider: CDC/Rob Weyant. 1998. Courtesy of Centers for Disease Control and Prevention.

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Box 1. Leptospirosis symptoms:³ acute and immune phases

Stage	Symptoms
Acute/septicaemic phase (anicteric leptospirosis)	<ul style="list-style-type: none">• Fever (may subside and reoccur)• Chills• Severe headache• Myalgia (back, thighs, calves)• Abdominal pain• Conjunctivitis• Temporary rash• Aseptic meningitis
Immune phase (icteric leptospirosis)	<ul style="list-style-type: none">• Jaundice• Acute renal failure• Pulmonary involvement: cough, dyspnoea, haemoptysis, pulmonary haemorrhaging• Cardiac involvement: myocarditis

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to approximately one death every 4 years.⁷

CLINICAL PRESENTATION

Recognising and diagnosing leptospirosis infection is challenging, thus knowledge of those at risk is important. Symptoms experienced are varied and non-specific (Box 1). Severe icteric leptospirosis develops in 5–10% of sufferers with mild anicteric form and is rapidly progressive. Leptospirosis is often misdiagnosed, frequently as meningitis or hepatitis.^{3,4} The incubation period is between 3 and 25 days. Leptospirosis is considered to be biphasic.⁴ First there is an acute onset of illness, the acute leptospiremic phase, known as anicteric leptospirosis. Sufferers experience flu-like symptoms including fever, chills, headaches, and myalgia. These persist for approximately a week. Although often quoted as characteristic, conjunctivitis occurs in only a third of cases.³

Sufferers appear to recover, but the illness may reappear and progress to the more severe immune phase, known as icteric leptospirosis. Leptospire are produced in the urine. The central nervous system becomes involved with symptoms such as meningitis. Progression to classic 'Weil's disease', with jaundice, renal failure, haemorrhaging, and myocarditis, may occur.³

Leptospirosis is probably under-diagnosed. Many cases are asymptomatic or only result in mild symptoms and thus not identified.⁴ Testing in endemic areas indicate that many have suffered past infection but have not reported illness. Serological testing is recommended, typically with an IgM ELISA test or a microscopic agglutination test (MAT). Useful blood tests aiding diagnosis include full blood count, electrolytes, renal and liver

function, and clotting studies. Spirochaetes in the urine are found in certain stages of infection.

Although most acute cases resolve without treatment, mild illness can be treated with antibiotics such as doxycycline or penicillin.³ More severe cases of leptospirosis can be treated with oral doxycycline or intravenous third-generation cephalosporins, for example, ceftriaxone.

FOREIGN TRAVEL

Although numbers affected in England and Wales remain steady (76 people in 2014, 63 in 2015, and 72 in 2016),⁹ an increasing proportion of these have contracted infection while abroad. In 2014, 19 cases were acquired abroad (25.0%), 33 cases (52.3%) in 2015, and 42 (58.3%) in 2016.

Public Health England provides information on the destinations visited by those presenting with leptospirosis.⁹ In the first to third quarters of 2017, 34 cases, from a total of 62, were acquired abroad. Locations visited included Southeast Asia, the Americas, Africa, and the Caribbean. The numbers contracting leptospirosis from abroad are likely to continue to increase as travel to these locations becomes more popular.¹⁰

CONCLUSION

Medical practitioners should be aware that leptospirosis may occur in these people not previously considered at risk. It should be suspected in patients presenting with compatible symptoms recently engaged in such active outdoor pursuits. Prompt diagnosis and treatment are important in preventing development of more severe forms of the illness.

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Competing interests

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